transmitted parameters for processing the sensor signal replace the originally prescribed parameters.

The analytical unit determines anew at least one of the parameters for processing the signal, and transmits at least one of these newly determined parameters to the signal processing unit over an existing connection line or, in some circumstances, an existing wireless connection path between the sensor unit and the analytical unit. The sensor-signal processing unit then uses the newly transmitted parameter to compute the output signal. If the analytical unit determines, after analyzing the sensor data and possibly other available data, that the sensor unit may sense the measurement value better with a changed set of parameters, the inventive method assures that the sensor signals in the future will be processed with this new parameter set.

In one embodiment, a connection line configured to transmit data from the sensor unit to the analytical unit is also used to transmit the newly determined parameters from the analytical unit to the sensor unit. The connecting line is preferably the output for the processed sensor signal. This embodiment has the advantage that no further connecting line is needed between the sensor unit with its sensor element and signal processing unit (which generally is present in integrated form on a chip) and the external analytical unit. In particular, this assures that this novel, inventive sensor system generation can easily replace the prior art sensor systems.

In a second embodiment, the transmission line for the determined parameters can be a common power supply line for the sensor unit and the analytical unit. In this case, too, as in the previous example, it is assured that an old sensor system can be replaced without any problem by a sensor system according to the present invention. Such compatibility is an absolute prerequisite especially for installation in a mass-produced product.

The invention specifies a third embodiment such that necessary changes of a parameter for the processing of the signal can be determined during running (sensor-) operation. It is further specified that at least one of the newly determined parameters can be transmitted to the signal processing unit while operation is in progress, so as to assure constant updating of the parameter set in the sensor-signal processing unit. This design of the invention is especially necessary if the sensor system operates or is supposed to operate continuously. That is, the parameters stored in a parametric memory associated with the sensor can be updated while the sensor continues to process sensed signal data.

In the case of a sensor system of the third embodiment, it is necessary that the process of transmitting a new parameter set does not interfere with the ongoing signal transmission from the sensor unit to the analytical unit. This is especially important for exact temporal association or for instant recognition of changes or disturbances. For this reason, a fourth embodiment includes a filter device that permits the newly determined parameters to be transmitted to the sensor unit only if this does not disturb signal transmission from the sensor unit.

In a fifth embodiment, at least one parameter can be transmitted by a change of an output load between the sensor-signal processing unit and the analytical unit. Such a load change can be caused, in well-known fashion, by the analytical unit and thus can be generated outside the sensor unit.

In yet another embodiment, the invention specifies that this output load can be varied continuously, or in steps.

Alternatively or additionally, at least one parameter can be transmitted by a change of a supply voltage for the sensor unit. Such a modulation of the supply voltage for the sensor unit

does not necessarily presuppose that the sensor unit and the analytical unit are supplied by one and the same voltage source. That is, it is contemplated that it is also possible to modulate the voltage supply of the sensor unit and especially of the sensor-signal processing unit by an appropriate control line.

Such a sensor system and such a method is generally applicable to programmable sensor systems in which an analytical unit (analytical electronics) analyzes a sensor signal and possibly other signals. For this purpose, the sensor can be programmed with one or more parameters. During operation, the analytical electronics determine whether or not a parameter should be changed. This wish for a change is communicated to the sensor on a channel which does not disturb the transmission of the actual sensor signals to the analytical electronics. By way of example, one can mention detection of magnetic field changes, a method which is especially used to measure the angular position of the crankshaft, camshaft, and ABS in a motor vehicle.

Advantageously, the techniques of the present invention facilitate updating parameter data of the sensor regularly during the operating life of the sensor.

These and other objects, features and advantages of the present invention will become more apparent in light of the following detailed description of preferred embodiments thereof, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 illustrates a first embodiment of a programmable sensor system; and

FIG. 2 illustrates a second embodiment of a programmable sensor system.